

# Vertex Location Study

(using “loc” files of located events)

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# Methods

## First method

- Simple impact parameter cut on vertices formed by pairs of tracks (cut  $\sim 10$  microns)
  - Number of pairs is reduced by binning
    - phi angle
    - starting plate
  - When a pair is found tracks are linked upstream
  - inefficiencies of this method:
    - When a pair is thrown out because one track links upstream, the tracks are not rebinned. (causes more garbage than misses)
    - if the only tracks which would form an acceptable pair are in the same bin

## Second method

- Match one good spectrometer track
  - make a list of all emulsion tracks which match the chosen spectrometer track. (8 mrad cut)
    - link these tracks upstream
  - loop over all starting tracks to find pairs which form vertices with these tracks. (10 micron)
  - the inefficiency of this method is less than that of the first method.
    - the set of “matched” tracks is linked upstream before vertices are formed.
    - Same starting plate cut is relaxed
    - will still have some misses because of lack of linking

Both methods employ:

- Adding other tracks to the 2 track vertices
- linking all vertex tracks upstream
- Removing tracks which start upstream of vertex
- Matching spectrometer tracks to reduce final set (should really be done in myanal)

# Results

- 10 loc files used
  - 5-400 vertices formed (depends on method)
  - After cleaning and filtering, “real” vertex was among final group of ~5-25 vertices in 9 of 10 events.
    - Real vertex was determined by comparing vertex position and track angles of my vertices to the known values.
      - Position within ~5 microns in  $u$  and  $v$ , ~500 microns in  $z$  (I do not fit vertex)
      - Angles within ~30mrad
    - Correct vertex chosen first: 7
    - Correct vertex chosen second: 1
    - Correct vertex chosen later: 1
    - Correct vertex not in final group: 1

## Reasons for misses:

- 3349\_06094 (second)
  - one other vertex had more ghost matches.
  - Cut on multiplicity chooses correct vertex, or it can be determined graphically.
- 3345\_21951
  - Two track vertex
  - In final group, but did not stand out until severe cut on match angle
  - Did not look at ip cuts
- 3356\_17099
  - missed because too few phi bins

# Conclusions

- Cheating and altering cuts I pick up all real vertices “first”
- Without cheating I could loosen cuts and pick up all real vertices without the addition of too much background.
- At that point (actually before that) I could pass off to myanal to pick the correct vertex. Should do this.